

Name: _____

at1118paper: Complete the Square (v403)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 58x = -837$$

Add $(\frac{-58}{2})^2$, which equals 841, to both sides of the equation.

$$x^2 - 58x + 841 = 4$$

Factor the left side.

$$(x - 29)^2 = 4$$

Undo the squaring. We need to consider both $\pm\sqrt{4}$.

$$x - 29 = -2$$

or

$$x - 29 = 2$$

$$x = -31$$

or

$$x = -27$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 28x = 128$$

$$x^2 + 28x + 196 = 324$$

$$(x + 14)^2 = 324$$

$$x + 14 = \pm 18$$

$$x = -32 \quad \text{or} \quad x = 4$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 56x = -775$$

$$x^2 - 56x + 784 = 9$$

$$(x - 28)^2 = 9$$

$$x - 28 = \pm 3$$

$$x = 25 \quad \text{or} \quad x = 31$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 40x = 441$$

$$\begin{aligned}x^2 - 40x + 400 &= 841 \\(x - 20)^2 &= 841 \\x - 20 &= \pm 29 \\x = -9 &\quad \text{or} \quad x = 49\end{aligned}$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 + 50x = -429$$

$$\begin{aligned}x^2 + 50x + 625 &= 196 \\(x + 25)^2 &= 196 \\x + 25 &= \pm 14 \\x = -39 &\quad \text{or} \quad x = -11\end{aligned}$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 + 22x = 455$$

$$\begin{aligned}x^2 + 22x + 121 &= 576 \\(x + 11)^2 &= 576 \\x + 11 &= \pm 24 \\x = -35 &\quad \text{or} \quad x = 13\end{aligned}$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 + 46x = -528$$

$$\begin{aligned}x^2 + 46x + 529 &= 1 \\(x + 23)^2 &= 1 \\x + 23 &= \pm 1 \\x = -24 &\quad \text{or} \quad x = -22\end{aligned}$$